

CLAIMS

We claim:

1. A method of producing a heat set plastic container comprising the steps of:

providing a plastic preform within a mold cavity;

expanding and stretching the preform into conformity with surfaces defining the mold cavity; and

inducing crystallinity in the plastic container by applying heat from an interior portion of the plastic container to an interior surface of the plastic container to raise the temperature of the interior surface to at least 120° C.
2. The method of Claim 1 wherein said inducing step includes using convection heat transfer to heat the interior surface of the plastic container.
3. The method of Claim 1 wherein said inducing step includes circulating a high-temperature fluid through the interior portion of the plastic container.
4. The method of Claim 3 wherein the high-temperature fluid includes air.
5. The method of Claim 3 wherein the high-temperature fluid has a temperature in the range of 200°C to 400°C.

6. The method of Claim 3, wherein the high-temperature fluid is at a pressure in the range of 100psi to 600psi.

7. The method of Claim 3 wherein the high-temperature fluid is introduced for a duration in the range of 1 second to 15 seconds.

8. The method of Claim 3 wherein said inducing step includes circulating the high-temperature fluid into and out of the interior of the plastic container.

9. The method of Claim 8 wherein said circulating of the high-temperature fluid is done continuously during said inducing step.

10. The method of Claim 3, wherein said circulating of the high-temperature fluid includes introducing the high-temperature fluid into the plastic container while also exhausting the high-temperature fluid from the plastic container.

11. The method of Claim 10 wherein said introducing of the high-temperature fluid occurs simultaneously with said exhausting of the high-temperature fluid.

12. The method of Claim 3 wherein said circulating of the high-temperature fluid includes directing the high-temperature fluid toward the interior surface of the plastic container.

13. The method of Claim 12 wherein said directing of the high-temperature fluid includes directing the high-temperature fluid substantially perpendicular to the interior surface of the plastic container.

14. The method of Claim 1 wherein said inducing step produces a plastic container having a sidewall with an average density in the range of 1.367 g/cc to 1.40g/cc.

15. The method of Claim 1 wherein said inducing step is performed while the plastic container remains within the mold cavity.

16. The method of Claim 1 wherein said surfaces defining said mold cavity have a temperature in the range of 120°C to 250°C.

17. A blow molding machine for producing a heat set container, said machine comprising:

a blow mold defining a mold cavity capable of receiving a preform;

a high-pressure fluid source;

a high-temperature fluid source;

a blow core assembly engagable with the preform and coupled to said high-pressure source and to said high-temperature source to supply high-pressure fluid and high-temperature fluid to an interior portion of the preform, said blow core assembly having an exhaust to exhaust fluid from the interior portion of the preform; and

a controller coupled to said high-pressure fluid source and to said high-temperature fluid source to selectively control the supply of high-pressure fluid and high-temperature fluid, said controller further coupled to said exhaust to selectively control the fluid exhaust.

18. The blow molding machine of Claim 17 wherein said blow core assembly further includes a stretch rod which is movable from a retracted position to an extended position to axially stretch the preform.

19. The blow molding machine of Claim 18 wherein said stretch rod includes an interior channel coupled to said exhaust.

20. The blow molding machine of Claim 18 wherein said stretch rod includes an interior channel coupled to at least one of said high-temperature fluid source and said high-pressure fluid source, said stretch rod further including at least one port to supply fluid to the interior portion of the preform.

21. The blow molding machine of Claim 20 wherein said port is oriented to supply fluid in a direction substantially perpendicular to an interior surface of the preform.

22. The blow molding machine of Claim 17 wherein said high-pressure fluid source supplies high-pressure fluid at a pressure in the range of 100psi to 600psi.

23. The blow molding machine of Claim 17 wherein said high-temperature fluid source supplies high-temperature fluid at a temperature in the range of 200°C to 400°C.

24. The blow molding machine of Claim 17 further comprising a pre-blow fluid source to supply a pre-blow fluid, said blow core assembly being coupled to said pre-blow fluid source to supply the pre-blow fluid to the interior portion of the preform.